



PATENT  
ATTORNEY DOCKET NO. 46884-5292

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Tatsumi YAMANAKA	)	Confirmation No.: 5412
	)	
Application No.: 10/829,385	)	Group Art Unit: 2811
	)	
Filed: April 22, 2004	)	Examiner: Sara W. Crane
	)	
For: SEMICONDUCTOR PHOTO-	)	
DETECTION DEVICE AND	)	
RADIATION DETECTION	)	
APPARATUS	)	

Commissioner for Patents  
U.S. Patent and Trademark Office  
Alexandria, VA 22314

Sir:

**SUBMISSION OF INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

Applicants bring to the attention of the Examiner the attached document.

Attached is an English-language translation of an International Preliminary Examination Report ("IPER") dated July 6, 2006 that issued in a related PCT/JP2004/012988 application. Applicants respectfully request that the Examiner consider the IPER as it relates to the above-identified application.

While the IPER cites to three particular documents, these documents are not attached hereto because they were previously filed in an Information Disclosure Statement in this application on January 26, 2006.

This submission does not represent that a search has been made or that no better art exists and does not constitute an admission that the listed document is material or constitute "prior art." If it should be determined that the listed document does not constitute "prior art" under United

States law, Applicants reserve the right to present to the office the relevant facts and law regarding the appropriate status of such document.

Applicants further reserve the right to take appropriate action to establish the patentability of the disclosed invention over the listed documents, should one or more of the documents be applied against the claims of the present application.

**EXCEPT** for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. § 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 50-0573. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. § 1.136(a)(3).

Respectfully submitted,

**DRINKER, BIDDLE & REATH LLP**

Dated: July 31, 2006

By: 

Peter J. Sisfare  
Registration No. 48,183

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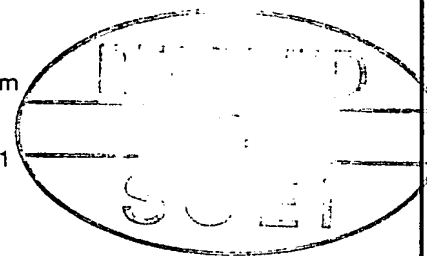
From the INTERNATIONAL BUREAU

**PCT**

NOTIFICATION OF TRANSMITTAL  
OF COPIES OF TRANSLATION  
OF THE INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY  
(CHAPTER I OR CHAPTER II  
OF THE PATENT COOPERATION TREATY)  
(PCT Rules 44bis.3(c) and 72.2)

To:

HASEGAWA, Yoshiki  
Soei Patent and Law Firm  
Ginza First Bldg.  
10-6, Ginza 1-chome  
Chuo-ku, Tokyo 1040061  
JAPON



Date of mailing (day/month/year) 06 July 2006 (06.07.2006)		
Applicant's or agent's file reference FP04-0138-00	<b>IMPORTANT NOTIFICATION</b>	
International application No. PCT/JP2004/012988	International filing date (day/month/year) 07 September 2004 (07.09.2004)	
Applicant HAMAMATSU PHOTONICS K.K. et al		

## 1. Transmittal of the translation to the applicant.



The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter I).



The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter II).

## 2. Transmittal of the copy of the translation to the designated or elected Offices.

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following designated or elected Offices requiring such translation:

None

The following designated or elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

AE, AG, AL, AM, AP, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EA, EC, EE, EG, EP, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OA, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

## 3. Reminder regarding translation into (one of) the official language(s) of the elected Office(s).

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability (Chapter II).

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned within the applicable time limit (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Authorized officer

Masashi Honda



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# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference FP04-0138-00	<b>FOR FURTHER ACTION</b>		See item 4 below
International application No. PCT/JP2004/012988	International filing date ( <i>day/month/year</i> ) 07 September 2004 (07.09.2004)	Priority date ( <i>day/month/year</i> ) 20 October 2003 (20.10.2003)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant HAMAMATSU PHOTONICS K.K.			

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- |                                     |              |   |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report   |
| <input type="checkbox"/>            | Box No. II   | Priority  |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention  |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited   |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application  |
| <input type="checkbox"/>            | Box No. VIII | Certain observations on the international application   |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No. +41 22 338 82 70	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Date of issuance of this report 26 June 2006 (26.06.2006)</td> </tr> <tr> <td style="padding: 2px;">Authorized officer  <div style="text-align: center; font-weight: bold; font-size: 1.2em;">Masashi Honda</div></td> </tr> <tr> <td style="padding: 2px;">e-mail: pt08@wipo.int</td> </tr> </table>	Date of issuance of this report 26 June 2006 (26.06.2006)	Authorized officer  <div style="text-align: center; font-weight: bold; font-size: 1.2em;">Masashi Honda</div>	e-mail: pt08@wipo.int
Date of issuance of this report 26 June 2006 (26.06.2006)				
Authorized officer  <div style="text-align: center; font-weight: bold; font-size: 1.2em;">Masashi Honda</div>				
e-mail: pt08@wipo.int				

# PATENT COOPERATION TREATY

TRANSLATION

From the  
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing  
(day/month/year)

Applicant's or agent's file reference

**FP04-0138-00**

**FOR FURTHER ACTION**

See paragraph 2 below

International application No.

**PCT/JP2004/012988**

International filing date (day/month/year)

**07.09.2004**

Priority date (day/month/year)

**20.10.2003**

International Patent Classification (IPC) or both national classification and IPC

Applicant

**HAMAMATSU PHOTONICS K.K.**

1. This opinion contains indications relating to the following items:

- |                                     |              |  |
|-------------------------------------|--------------|--|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the opinion   |
| <input type="checkbox"/>            | Box No. II   | Priority   |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability   |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention   |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited  |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application   |
| <input type="checkbox"/>            | Box No. VIII | Certain observations on the international application  |

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/JP

Authorized officer

Facsimile No.

Telephone No.

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/012988

Box No. 1

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language  
\_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/JP2004/012988

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability:  
citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	3-6, 8-10	YES
	Claims	1, 2, 7	NO
Inventive step (IS)	Claims	5, 6	YES
	Claims	1-4, 7-10	NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims		NO

2. Citations and explanations:

List of cited documents

Document 1: JP, 3-148869, A (Fujitsu Ltd.), 25 June, 1991 (25.06.91), page 5, upper left column, line 9 to page 6, upper left column, line 6, Figs. 6 and 7, (Family: none)

Document 2: JP, 11-289100, A (Fujitsu Ltd.), 19 October, 1999 (19.10.99), paragraphs [0017]-[0029], Figs. 1-5, (Family: none)

Document 3: JP, 2003-86827, A (Hamamatsu Photonics K.K.), 20 March, 2003 (20.03.03), paragraphs [0014]-[0024], Figs. 1, 2 and 5, (Family: none)

Claims 1, 2 and 7

Cited document 1 describes a light detector with light incident on the rear surface having a pn-junction region for releasing signal charge formed to enclose adjacent pn-junction photodiodes between the pn-junction photodiodes formed on a surface of a substrate opposite the light-incident surface.

Cited document 2 describes a light detector with light incident on the rear surface having an electron releasing section comprising a pn-junction region formed to enclose adjacent pn-junction photodiodes between the pn-junction photodiodes formed on a surface of a substrate opposite the light-incident surface.

Claims 3, 4 and 8

Cited document 3 describes a photodiode array with light incident on the rear surface wherein a channel stopper layer (a) formed to enclose each pn-junction photodiode formed on a surface of a substrate opposite the light-incident surface, and being (b) of the same conductive type as, and (c) with a higher concentration than, the said substrate, is provided. A person skilled in the art could have easily added the said channel stopper layer between the invented pn-junction photodiode of cited document 1 or 2 and the pn-junction region for releasing charge.

Claims 5 and 6

Neither of the constitution that a ground electrode connected to a pn-junction region and a highly concentrated impurities region is provided, and the constitution that two ground electrode connected to a pn-junction region and a highly concentrated impurities region respectively in the state that the two electrode are insulated from each other, is described in any of the documents cited in the ISR, nor would be obvious.

Claims 9 and 10

A person skilled in the art could have used the light sensor of cited document 1 or the light-sensing element of cited document 2 in substitution for the photodiode array in the radiation detector shown in Fig. 5 of cited document 3, as required.